Local Station Additions for Acnet

Local applications and more

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The Linac controls upgrade to the local station software required several additions to that software in order to fit into the Acnet system requirements. This is an *ad hoc* list of some of those changes.

Local applications

A local application is a software procedure that is invoked by the system software to provide a particular feature without being linked into the system code itself. It is therefore a modular addition to the local station software. Any local application can be independently enabled and updated to a new version even while the system is running. It is known by name and not by memory address; space for a copy in non-volatile memory is handled automatically by the system support. A given program can also be updated in all local stations at once using token ring network group addressing. Examples of existing local applications and their purposes follows:

`GRAD`
Regulates rf amplitudes in the cavities to compensate for long term drifts

`PHAS`
Regulates rf intertank phase for long term drifts

`CROB`
Automatic recovery from pa crobar trips of rf system

`DRIV`
Automatic recovery from rf system driver trips

`PINH`
Automatic reduction in rf gradient setpoint after rf trip w/o recovery

`QUAD`
Automatic recovery of drift tube quad power supply trip

`PRES`
Regulates ion source pressure

Note: the above set of 7 closed loops always existed in Linac local stations.

AERS

Alarm Event Reporting System shepherds alarm messages to AEOLUS, the Acnet alarm-handling process which runs on some Vax.

FTPM

Fast Time Plot Manager supports requests for data to be used by the Fast Time Plotting facility which runs on Vax consoles.

AAUX

Acnet Aux provides for "ping"-type support to check communications.

GATE

Permits gateway support of Acnet-header communications allowing for copying memory from an SRM to any other SRM.

NETM

Network Monitor ensures that network frame reception is working and automatically re-connects to the network if it is lost.

TEMP

Regulates water system temperature for the new Linac rf modules

KRMP

Assists during conditioning of the new rf modules. Also collects detailed spark statistics.

FREQ

Controls a VCO to keep the cavity resonant following application of a large change in rf power to the cavity.

Page applications

Application display programs that run on the small local consoles have always been a part of the local station software. The original Linac supported the standard set of 4 below. Several new page applications have been added in the course of the controls upgrade for Linac.

PARM

The parameter page is used widely in Fermilab accelerator controls systems to support general display, control and plotting of analog parameters.

EDAD

Edit Analog Descriptors provides for entry of *analog* device information into the local station database.

EDBD

Edit Binary Descriptors provides for entry of *binary* device information into the local station database.

MDMP

Memory Dump allows flexible inspection of memory for both hardware and software diagnostics.

Note: The above 4 are the original basic suite of page applications.

SURV

The Survey page assists in maintenance of the large number of token ring nodes that are attached to the token ring network.

REQR

Request Reply timing can be histogrammed for the Classic protocol.

CRTI

CRT Image permits running a page application remotely on another node. Implemented in another platform, it permits running any page application from another platform, such as a workstation or Macintosh.

SRMC

This SRM Copy page uses the GATE gateway local application to support the copying of memory between any pair of SRMs.

New modules

Several new modules provide additional support needed for the new Linac controls system.

ACREQ

This large module provides complete support for the accelerator data acquisition protocol, sometimes referred to as RETDAT/SETDAT. Included is support for offset/length to provide generic access to the local station database to assist in uploading to the central database. Also included, to reduce network traffic to the consoles, is server support, in which all Linac device data is retrieved from a Vax console through a single "server node", which in turn collects more efficiently from the "real" source nodes. Again, to reduce the usual network traffic load on Vax consoles using the standard Parameter Page, averaging support is provided for analog device readings, preferentially averaging beam pulses over no-beam pulses.

OPENPRO

To facilitate the support for additional protocols, a set of routines is used with a Protocol table to route communications for more protocols through the ACREQ module. In particular, it is now possible to write a local application that supports a new network protocol of the Acnet-header type. Examples of such LAs are FTPM, AAUX, and GATE.

ARCINT, SRMREQ

Arcnet network support was added to the system in order to communicate with the SRMs, which are the data acquisition interface for the new Linac. A new simple data acquisition protocol was designed for use with the SRMs. Special data access table entry types were also needed to permit collection of data via Arcnet, taking maximal advantage of arcnet communications.

LOCAPPL, SETPROG

These two modules provide the support for local applications and the associated downloading of same.

ASTATUS

Composite status words are assembled from the digital I/O interface via a table-driven scheme. These words can be scanned for alarms in parallel, to mimic the traditional Tevatron notion of power supply status words.